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ABSTRACT

Stressing that learning to write is learning to think, a series of workshops showed teachers in the content area how to use writing in their classrooms. Following a brief introduction to the program, workshop participants developed eight guidelines for creating effective writing assignments: (1) make all assignments worthwhile, (2) make them clear, (3) create assignments students could realistically accomplish, (4) do the assignments with the students, (5) insist that students write complete sentences and use their own words, (6) determine evaluation criteria, (7) grade rather than correct papers, and (8) share evaluation criteria and evaluations with students. After practice in writing worthwhile questions for students, teachers assigned writing to their classes and then gave workshop presentations explaining the rationale and procedures followed for these assignments. They asked their colleagues to grade three student papers and then defend the actual grades given. Workshop presentations covered writing assignments in biology, ecology, mathematics, French, economics, and social studies, as well as teacher writing for students. Teacher assessment of the workshops was generally positive, noting greater student commitment and motivation. Suggestions for future workshops included grouping teachers according to content areas. (Several examples of student writing samples are included.) (MM)

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WRITING TO LEARN

By
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FOREWORD

"There was *no way* I was going to use writing in my math classes," said Jane Springfield, confessing that she signed up only because she was curious. Jane was one of 32 women and men who took part in a project that proposed to show schoolteachers why they should, and prove that they could, make effective use of writing in their classes, whatever their subjects. Curious she was, and conscientious. She found, soon enough, that when she taught conceptual material, her students understood better if they wrote about it. She found, too, that when they knew they were going to write, they were especially attentive in class. And after a few weeks, when they began to ask, "Are we going to write today?" she realized that they *liked* to write in math class.

Sponsored by the Council for Basic Education and supported by the Geraldine R. Dodge Foundation, the project involved two groups of teachers from a total of 12 schools, public and private, during the 1982-83 academic year. One of the groups met for four one-day workshops at intervals of approximately three weeks. The other group held three day-and-a-half workshops at comparable intervals. Between workshops, I was able to visit the classes of most of the teachers in the project—not to observe them after the manner of a professional evaluator, but to get a sense of the students and the subjects they were teaching. I was able to arrange a post-project "reunion" with one group, and teachers in the other group have kept me informed of their plans and progress.

Like Jane, others who began with misgivings finished with conviction. Still others, who didn't need convincing, were better enabled to make use of writing because they had discovered how to use writing as a discipline of learning rather than a time-consuming and burdensome method of testing. Of course I cannot say that without exception all the participants took a new lease on teaching as a result of the project, although many behaved as if they were released from something that had been holding them back.

But that's getting ahead of my story, which unfolds in the following pages. The story offers a perspective on writing in school that differs from the view of educators who see writing as a problem, and from the myopia of teachers who wrap writing up as a package of communications skills. It is a perspective in which writing becomes an opportunity any school may seize to bring about better teaching and sounder learning.

What more could any school want?

James Howard
1983

Writing samples included in this volume have been printed exactly as they appeared when submitted to teachers. Any loss in legibility is offset, the editor hopes, by seeing students' actual responses to classroom assignments. The names of teachers appearing in this report have been changed. Any resemblance of these names to actual persons, living or dead, is purely coincidental.

1.
LITERACY IN GENERAL, WRITING IN PARTICULAR

It has become commonplace to speak of education as if it were largely the acquisition of *skills*. This is not to say that "content" or "subject matter" has gone out of style. Ours, after all, is an information society now, and subject matter has never mattered so much. Educators are not altogether sure *what* subjects matter, and with disconcerting frequency they invent new "educations" to close information gaps, but only the most loosely liberal would wittingly forsake transmission of the culture as one of the chief ends of education.

The contemporary infatuation of educators with skills dates back to that time of crisis when word got out, first, that Johnny couldn't read, and then that he could neither write nor do arithmetic. Instruction in "survival skills" tided Johnny over until educators got their minimum competency act together, and that ushered in a season of preoccupation with "basic skills," each of which proved to have a growing family of subskills.

But basic skills and their subskills, educators learned in short order, were not enough. Johnny was learning to read something and write something and do some arithmetic, but he couldn't solve problems. For a time, then, "problem-solving skills" and their companions, "decision-making skills," took the fancy of educators. Johnny's difficulty is even more difficult than they dared to believe, however. Problem-solving and decision-making skills are only the tip of an iceberg. The terrible truth is that Johnny is missing the entire spectrum of "higher-order skills." To put the matter squarely, he can't think.

How will educators confront this latest, biggest-yet crisis in the classroom? To meet lesser contingencies, they have invented Alcohol Education, Bilingual Education, Career Education, Driver Education, Energy Education—at least one education for almost every letter of the alphabet. Clearly, the present condition calls for Thinking Education. Already there are publishers in the field with "thinking skills materials" to sell.

Writing to learn

Before they invent Thinking Education, educators ought to consider with intensive care the implications of literacy in general and writing in particular. Reading is much, much more than the relatively simple function of decoding words. Writing is much, much more than the mechanical exercise of discrete communications skills that can be learned by heart in the early grades of school. Reading and writing are the literacy that is our primary means of access to learning and knowing, and the truly literate person commands most of the higher-order skills Johnny lacks.

Glassboro State College's notorious Underground Grammarian, Richard Mitchell, holds that "the literate person is in control of those techniques special to writing rather than to speech." In *Less Than Words Can Say*, he explains:

> He can formulate sentences that make sense. He can choose the right word from an array of similar words. He can devise the structures that show how things and statements and statements about things are related to one another. He can generate strings of sentences that develop logically related thoughts, and arrange them in such a way as to make that logic clear to others. He can make analogies and define classes. He can, in writing, discover thought and make knowledge.
>
> Because he can do these things, he can, in reading, determine whether or not someone else can do these things. He is familiar with a technology of thinking. To accept anything less as our definition of literacy is to admit that hardly any of us will ever be able to think about anything. That may be true, but to admit it is to ensure it.[1]

Of course there have always been perceptive individuals who understand the relationship of writing and thinking, and several spoke out even as "The Great American Writing Crisis"[2] gathered in the mid-1970s. J. Mitchell Morse of Temple University marked the intellectual helplessness of students "without practice in combining many words in many ways," and Yale's A. Bartlett Giamatti observed that millions of schoolchildren are told the lie "that if they transcribe what they feel about anything it will somehow turn into what they think."[3] Carlos Baker of Princeton put it succinctly: "Learning to write is learning to think."[4]

My perception of the connection between writing and thinking or learning began with two revelations in my early experience as a teacher of history. In the school where I was teaching, daily quizzes, period tests, and final examinations were all given in the form of "essay questions." When we graded students' papers, we were little concerned about the essays; we settled for scraps of evidence that our students had been exposed to our tuition. Still, like schoolteachers everywhere, I dreaded correcting all those papers, and let them accumulate.

It was while I was yawning my way through one such accumulation that the first revelation woke me up. It occurred to me that if what students wrote on those papers represented what they learned in my history classes, something was radically wrong. It wasn't their misspelling and faulty grammar that shocked me; it was the unintelligibility of what they wrote. They didn't make sense; there were traces of historical fact, but little or nothing to suggest that they understood the facts.

I determined to do something about their writing. For weeks I worked with them—in the context of the history they were studying. Although I did not overlook their grammar and spelling, I discounted it. I wanted evidence that they understood what they were reading, what we were discussing; and so I pressed them to make sense, to make meaning. I insisted that they write in complete sentences, with subjects and predicates—not to be correct, but to have whole thoughts; and I pressed them to the wall to choose accurate words and put them together coherently.

It was hard work, for them and for me. But they responded, and their writing improved. Then I had the second revelation. I realized that now, my students knew what they were talking about in class. Whether it was about absolute monarchy or free trade, I could be sure they understood. They talked about such concepts not in partially memorized textbook or teacher terms, but in their own words. Clearly, they had not merely been learning to write; they had been writing to learn.

From then on, writing in my classes ceased to be the perfunctory testing device it had been, and became part of the fabric of teaching and learning. And when, in recent years, educators and researchers confronted the "writing crisis," I watched hopefully. I hoped writing might be spared the fate of reading, which has long been taught as a subject by itself, unrelated to the other subjects children are expected to learn, and a subject they are expected to learn once and for all in the early grades of school. I hoped, too, that writing would be assessed at its full value, understood and used in school, not as an accessory but as part of every student's access to learning and knowledge.

The new writing programs

By now, just about every school in the country has done *something* about writing. Shirley Boes Neill's 1982 report, *Teaching Writing: Problems and Solutions,* bears out my estimate that the most commonly accepted bit of wisdom in the new writing programs is that "writing is a process, and it must be taught that way."[5] To their credit, the researchers, curriculum specialists, and teachers who have developed the programs have successfully

established the truth that writing is not simply a function of grammar, but a "composing process" that ordinarily requires preparation, planning, and revision. Encouraging, too, is the fact that writing programs are now commonly part of the curricular furnishing of secondary school. Of course that may be only for remedial purposes; but it is conceivable that here and there programmers recognize that children can't learn all they will ever need to about writing by the time they clear the sixth grade.

More than one researcher has recognized that a student can "write to learn even as he learns to write," as Robert A. Gundlach, Director of Writing Programs at Northwestern University, has put it. In *Writing in the Secondary School: English and the Content Areas*, Arthur N. Applebee of Stanford is explicit about the importance of writing in subjects other than English, acknowledging that "writing can be a powerful process for discovering meaning, rather than just transcribing an idea that is in some sense waiting fully developed in the writer's mind."[6] And at Beaver College, Elaine Maimon has demonstrated that "writing across the curriculum" can be richly educational as well as entirely practicable.

Notwithstanding, writing in school remains for the most part the concern of English teachers, many of whom would rather teach literature than writing; and although it is taught now as a process, writing is still treated as if it were little if anything more than an aggregate of "communication skills"—skills that are often useful, occasionally necessary, but hardly vital to learning. The charge by writing crisis managers that "all teachers must be teachers of writing" has not been received as new pedagogical gospel, and responsibility is readily shrugged off with the disclaimer, "That's not my department."

To serve the common cause

If English teachers are loath to teach writing, it is hard to fault others for disclaiming the responsibility and wanting to teach science, history, art—whatever the subject in which they were trained and appointed to teach. Many would nevertheless make good *use* of writing, however, if only they knew how. Jane Springfield's curiosity was not unique.

Schoolteachers today are not the incompetent or illiterate lot some of their critics make them out to be; but unlike their predecessors of a generation or two ago who wrote their way through school and college, they have had little experience of writing. They were not often required or expected to write when they were in school and college, and they do comparatively little writing now. Few write with much confidence or imagination, and the

writing of their students puts them in the way of such time-consuming frustration that it isn't worth their while or their students'.

The pages that follow describe a project that attempted to speak to the curious and enable the frustrated. This was not an attempt to make them teachers of writing, although inevitably they must have found themselves teaching writing in some sense (and just as inevitably have become better writers themselves). Nor was it a veiled attempt to undermine writing programs now in place. If the project may be said to have effected an end run around most programs, however, the run was made in the common cause of literacy and learning. Of course children in school should be taught "communications skills"; but there can be no gainsaying that their best reason for writing in school is to learn.

2.
THEORY, GUIDELINES, AND PRACTICE

The strategy of the project called for each participant to develop a plan for writing in one class. First, however, teachers had some theory, walked a course of guidelines, and did setting-up exercises. In their classrooms, they set students to writing short papers, then longer papers, and returned with exemplary assignments and papers for presentation at the workshop. The presentations were, in effect, the curriculum of the project, and occupied most of the workshop time. It was only at the last workshop that teachers were ready to draft plans.

The theory

"The ability to do some reading and to do some writing is a kind of literacy, to be sure," says Richard Mitchell, "but it is the kind that might have been attained 3,000 years before the invention of discursive prose and the birth of formal reasoning."[7] Schoolteachers need a conception of literacy more sophisticated than its simple definition as the ability to read and write.

We began with an elementary lesson in etymology.

What, essentially, do our words *language* and *literate* mean? Whereas *language* derives from the Latin *lingua* and means what we do with our tongues, *literate* comes from *littera* and alludes to the letters that represent what we do with our tongues. Unlike the characters of Chinese writing which represent ideas, our letters are sound symbols, and the lettered or literate person is one who can put the symbols together in meaningful discourse.

The next step toward sophistication was an exercise in comparison and contrast.

What have language and letters in common? How do they differ? Language (speaking) and letters (writing) are both means of communicating; both afford the means of expression; people use both the words they speak and the words they write to give substance and form to their thinking. When one speaks, one has the advantage of a variety of props or accessories—tone of voice, inflection, gestures, facial expressions, postures. Ordinarily, one also has the benefit of a "live" audience, whose immediate responses and reactions prompt one to take back, correct, or modify what one has just said. A small enough audience often puts words in one's mouth.

Writing, by contrast, is a solitary act. There is no audience present; one has only a future audience, if that, and none of the speaker's props. Given an assignment or purpose to carry out, one is obliged in the solitude of his mind to sort out what he has been taught, what he has read and discussed, experienced or imagined; and having sorted out, one has by himself to put together—literally, to compose—the sortings in a context or relationship that fulfills the assignment or accomplishes the purpose.

Test the theory. When you think you have an idea, try putting it in writing. You'll find out in short order whether you really have an idea or not. Chances are, you have had nothing more than an impulse. After you have searched your mind for the words and composed the statements that give the impulse substance and form, then you may be said to *have* an idea. Once you have it, you can give it away (communicate) or not, as you like; you may only want to use it. But you can do neither unless you first have it.

It is precisely because the cognitive activity called learning depends upon the same kind of sorting and searching, the same putting knowledge together, that teachers of all subjects ought to make use of writing in their classes. For the same reason, Richard Mitchell can say that the literate person is in control of those techniques special to writing.

The guidelines

Teachers assent. The theory is plausible, the imperative logical. But the gulf between *ought* and *can* is a formidable deterrent. They want guidelines. Real guidelines, not rhetoric.

The project gave them eight.

1. Make every writing assignment worthwhile—worth your students' while, worth yours. Every assignment should be calculated to help students learn something they need to know in order to have the benefit of the subject you're

teaching them. Although it's fair game to give quizzes that "encourage" them to do their homework, it is foolish and impertinent to ask them to write to questions that call for trivia, and downright perverted to try to trick them on obscure or difficult details they probably won't understand or may easily miss on first reading. By the same token, test and examination questions should ordinarily search out their knowledge and understanding of the mainstream of your subject, not the creeks and tributaries. Design projects like term papers that are appropriate for the aptitudes and interests of individual students but at the same time serve your purposes as a teacher of science, history, art, whatever. Make *every* assignment worthwhile.

2. *Make each assignment unmistakably clear.* This is one of the two most difficult guidelines to follow. Not only does it take time, patience, trial, and error to learn how to make assignments clear enough for students to proceed confidently; teachers also have to know precisely what it is they expect their students to learn. That takes time and experimentation, too; but when teachers determine precisely what they expect their students to learn, their teaching becomes more effective and efficient because it is focused. Whatever time they spend getting into focus, their greater efficiency probably pays back, with interest.

3. *Make assignments realistically.* That is, make assignments your students can be reasonably expected to accomplish, given the time at their disposal, the instruction they've had, and the preparation they have done. With only ten minutes to answer a question on last night's homework, few students can write a very thoughtful or comprehensive paper, much less a paper that's free of misspellings, sentence and punctuation errors, and other mistakes. On the other hand, even a mediocre student may be expected to develop a thoughtful piece of writing (though not necessarily a long one) *and* one that is free of mechanical errors if he has done the relevant reading and taken part in class discussion, and written out of class on his own time. In this connection, it is important to bear in mind the commonly neglected truth that just the physical act of writing—even mindless writing—is a time-consuming task.

4. *Do the assignment yourself.* There is more than one good reason why teachers should themselves write the assignments they give their students. Perhaps the best reason is that by writing himself, a teacher can estimate the reasonableness of an assignment for his students. And if he writes the best answer he can in the time he intends to give them, he'll have a headstart on determining sensible criteria for judging their writing. And if, occa-

sionally, he writes with them—letting them see him scratch out words and lines, tear pages up, struggle to "say what he means"—they will have the reassurance that comes with better understanding of the nature and purpose of writing.

5. Insist that students write complete sentences, using their own words. Sentence fragments are very likely to represent incomplete thoughts. Lots of students can't call subjects and predicates by name; but they know what subjects and predicates are, because they've been using them since they were tots. However you explain it, insist that your students close the circuits of their thinking by writing whole sentences—statements with subjects, verbs, and complete predicates. Encourage them to use their own words. Meager as their vocabularies may be, in those vocabularies there are usually words that will accurately serve their purpose in doing your assignment. If they are going to learn anything by doing the assignment, it is vital that they find those words. When they have (or think they have) no alternative to using memorized textbook or teacher words, insist that they translate.

6. Determine the criteria for marking their papers, and validate your criteria by reading a sampling. If you have already written the assignment yourself, you have a pretty specific idea of the material you can expect to find on a good paper written by a student under your tuition. Compare what you have written with the papers of two or three students whom you'd expect to write good papers. If yours and theirs include much the same material, you have your criteria. If there is a wide discrepancy, chances are your teaching has fallen short or miscarried. Develop criteria on the basis of the good student papers. Better still, discount the assignment.

7. Grade, don't correct, papers. If there is correcting to be done, that is the responsibility of students. And don't waste an inordinate amount of time writing comments. It may prick your vanity to know that few students pay much attention to the comments you write with care and caring; some pay no attention. You had better spend your time meeting the teacher's responsibility to decide what each student's work is worth. This is an intellectually demanding responsibility that requires close analysis, using criteria that are often less than precise. Because it's hard to fail students—and because one's judgment of a student's work is commonly mistaken for judgment of the student—grading papers is also emotionally stressful. Leaning on the criteria you have determined, read for what the student actually said, not for what you're willing to believe he meant to say. Accurate diction, development of thought, coherence—these are the qualities that matter. Misspelling, punctuation

errors, faulty grammar, and poor usage ought to be discounted—except when these interfere with the writer's intelligibility, or when the writer had plenty of time and easy access to help.*

The first question in evaluation is, simply, "Has the writer carried out the assignment or answered the question?" If for any reason he patently has not, the paper can have only a failing grade. If the writer has in full or part done the assignment or answered the question, evaluation calls for further questions: "How well?" "To what extent?" Difficult as it may be and invidious as it sometimes may seem, with discipline and practice it is possible to distinguish between marginal, satisfactory, better-than-satisfactory, and excellent papers. Just about every grading scale known to teachers makes provision for these distinctions, and it is the quintessential responsibility of schoolteaching to make them conscientiously.

8. Share your criteria and evaluations with students. Instead of just "going over the questions" when you return papers, explicate your criteria and show how you made distinctions between passing and failing, marginal and average, and so on. This doesn't take a great deal of time, and it won't become a grade-grubbing carnival if you stick to the questions and the criteria rather than individual papers. Remember, the goal is to help students learn the subject you are teaching, and this practice will help. Occasionally, go a step farther. Explain the criteria, shuffle their papers, and let students grade each others' papers. If that seems risky, remember that unlike indoctrination, teaching is a risky business. One clear risk in this instance is the risk that students will learn even more. Be sure to count the grades they give each other.

The practice

There are two reasons why framing questions and wording instructions are centrally important.

A schoolteacher's job is to educate the young—to lead students out of the darkness of their ignorance into the light of the teacher's subject. Teachers sometimes try to be cryptic or clever about wording questions—either simply because being clever is fun or because they're afraid that by being straightforward and explicit, they will give too much away and lead students directly to the answers. More often, they're just clumsy with good inten-

*Don't take misspelling and bizarre usage casually, however. Both may reflect a student's learning—an honest attempt to spell an unfamiliar word, for example, or a groping for words to explain or understand. From time to time teachers who are good at grammar and punctuation can take advantage of mistakes to show students how, with correct grammar or punctuation, they might have made more accurate or effective statements; and certainly, when a student's mechanical errors interfere with his intelligibility, teachers should help him understand why. In my view, teachers ought not to accept papers that are cluttered with errors—or just plain sloppy—if the writers had plenty of time and access to help. Let those who want credit rewrite the papers with whatever help they need.

tions. If it is the schoolteacher's job to educate the young—to lead them out of darkness into the light of science and mathematics, art and music, history and language—it follows that instructions for writing should lead them with particular care.

The second reason framing questions is centrally important is that giving students such leadership obliges their teacher to determine precisely what they need to learn; and that precision, in turn, makes for vastly more efficient and effective pedagogy. Teachers who determine what is most important for students to know in the syllabus are not likely to spread themselves too thin, to try to cover too much, to waste their own precious time. Neither are they likely to leave their charges in the kind of confusion and uncertainty girls and boys commonly suffer at the feet of teachers whose preparation satisfies the requirements of lesson-plan-making but still lacks precision.

Before they went out to give their classes writing assignments, workshoppers practiced. Each teacher in the project singled out discrete pieces of knowledge students ought to master during the following two or three weeks. These might be facts, formulas, concepts, definitions—whatever; but they had to be something students needed to understand and control in order to move forward with the work of the course. Then the teachers framed assignments students might write in 15 minutes of class time, or less.

Here are five of their practice questions:

> You have used the equal sign when writing algebraic statements. Interpret the use of the equal sign when writing geometric statements.
>
> Pretend you are a crab living in the intertidal zone. What adaptations would you need to survive in your environment?
>
> How do we define the term "gross national product," and what are the strengths and limitations inherent in such a term?
>
> How can we tell that an area has experienced a period of glaciation?
>
> How did the issue of the extension of slavery into newly acquired territories 1820–1850 lead to the Civil War?

Although these looked like perfectly good questions, teachers were on their toes and did not accept them at face value. In 15 minutes, what that's worth writing can a student say about slavery in the territories leading to the Civil War? Might not that question be more simply and effectively stated, "How did the extension of slavery into newly acquired territories become an issue that led to civil war, 1820–1850?" Any question that begins with "How do we define" or "How can we tell" is calculated to get back, verbatim, what teacher or textbook has

given, not what student understands. What does "interpret the use" mean? Who wants to pretend he's a crab? All of the practice questions deserved, and got, close critical analysis.

The project teachers all wrote answers to their own questions, too. This part of the practice did not entail trial by one's peers, however, and passed as a no-fault exercise for its own sake.

The length and uses of writing assignments

It is the besetting sin of some teachers to assign writing by the number of words or pages they expect a paper to be. These are likely to be teachers who do not make regular use of writing, and resort to it only for such occasional purposes as term papers, or perhaps for "enrichment" activities. They presume that the more important the paper—that is, the more it is to count in their gradebooks—the longer it should be. They pass this confusion of quantity with quality directly along to students, who tot up the words they write, line by line, or stretch out material to fill the expected number of pages, and in the process forfeit their opportunity of writing to learn.

Teachers in the project were warned to eschew the fallacy. Term papers and other projects that involve extensive writing have their places, but in most subjects short pieces of writing better serve the day-to-day purpose of learning. And as a rule, it is wise to let the length of a piece of writing depend not on a predetermined number of words or pages, but on the amount of time students have to write. Given ten or fifteen minutes to recall, sort out, and compose, a student can hardly be expected to write much more than one good paragraph; given an entire class period, two pages, more or less.

How and when were teachers in the project to use writing assignments? That they would have to find out for themselves. Before objective testing drove writing out of the schools, teachers conventionally used writing to test their students. Testing is fair game now, as long as the tests are conceived to enable students to confirm what they have been learning over a period of time—a week or two or three. But if the tests serve no better purpose than to get back what students have memorized, writing is an utter waste of time. Better give true-false or fill-in-the-blank tests. By the same token, ten-minute quizzes are nothing but educational snares if their only intent is to find out whether students have missed some trivia, on the pretense of making sure they've done their homework. On the other hand, a quiz that intends to help them nail down a fact or an idea in last night's homework reading, or put together the essentials of yesterday's class discussion, clearly has a place in teaching and learning.

The key was to make writing worthwhile—worth their students' while, worth their while. In this connection, teachers were reminded that at the outset, they would probably spend what seemed like an inordinate amount of time planning and marking; they were promised that experience would pay them back, with interest. Some followed the convention of using writing primarily for quizzing and testing; others, as we shall see, imaginatively found ways to use writing that served their purposes more effectively. Many let their students in on the project, explaining what they and I were up to, and this confidence undoubtedly enhanced the project. The assignments they brought back to successive workshops passed the worthwhile test with flying colors.

3.
THE CURRICULUM OF THE PROJECT

Each workshopper, in turn, was obliged to rehearse an assignment he, or she, had given a class—to say what the assignment was, why it was worthwhile, what preparation students had for it, how much time they had to write, and whether they wrote in or out of class. After each explained the evaluation criteria, all the others graded copies of three students' papers, doing their best to follow the presenter's criteria. And after the surrogate marks were tallied, the presenter disclosed and defended the actual grades.

Presentations are the stock in trade of schoolteachers, and teachers in the project rose to these occasions. Standing at the chalkboard explaining, or sitting at tables reacting and responding, they were in their element. Not every moment was exciting, nor was every presentation a classic, but the procedure was remarkably effective. Workshoppers taught each other, learned from each other, and laid bare the soul of teaching school.

The presentations left a mine of material this report cannot exhaust. There were assignments and papers in general science, biology, chemistry, earth science, ecology, and oceanography; in arithmetic, algebra, and geometry; in French and in music; in history, economics, and social studies. There was even a presentation in "remediation." Singling them out has proved a laborious task, but a necessary one to make a representation of the work accomplished, the examples set. The selections that follow not only demonstrate students writing to learn a variety of subjects, but also display different ways which teachers found to use writing so as to help students learn those subjects. To the extent that the writing made legible copies, I have used copies of the actual papers students wrote—not to amuse readers, but to remind them that if one is looking for students to learn, one must often see through mistakes, false starts, and plain untidiness.

A model presentation

The assignment Sally Arlington gave her ninth grade honors class in biology offers a good model or illustration. The assignment was straightforward, explicit; and because it comprehended the class's study of genetic variety, it was patently worthwhile. Sally's criteria were relatively precise, and all but two dissenting workshoppers gave the papers the same marks that she gave. Although the writers were all honor students, their papers ranged in quality from below average to excellent.

Here is the assignment. Students had 20–25 minutes of class time to write.

> Show how genetic variety can be produced within the limits of the existing gene pool. Use as many of these concepts as possible: multiple alleles, codominance, incomplete dominance, mutation, polygenic inheritance, crossing over, chromosomal aberrations, chromosome numbers.

The papers of three students appear below.*

Biology
15 point
Essay Question

On the crossing of a red flower and a white flower many things can occur. some of them are, incomplete dominance, mutation, polygenic inheritance and multiple alleles.

When crossing a red and white flower it is most likely to think that the red flower will dominate over the

*I have translated all grades to conform to these: A = excellent, B = better than average, C = average, D = marginal, F = failing.

white, but it doesn't. Incomplete dominance occurs, and as a result 2 pink flowers, 1 red flower, and 1 white flower occur as the offspring.

While in the process of making the flower perhaps a mutation occurs causing the offspring of the flowers to have a stronger red, or a stronger white influence. The offspring then will be a darker or lighter pink.

The result of polygenic inheritance is pink flowers. An allele from the white flower and an allele from the red flower blend together, creating a pink flower.

There ~~are more~~ at least 2 alleles for the color red, and at least 2 for the color white. When the offspring occur they are pink because of the blend

ing of the colors. Therefore the pink flowers have at least #2 alleles 1 for red and 1 for white

Chapter 10 Essay Questions

The following examples show how genetic variety can be produced within the limits of the existing gene pool

First, multiple alleles allow for many more combinations in genes than when just two alleles make up a gene. With two alleles there are only three combinations, but with 3 or more alleles, the combinations are greatly increase.

Codominance contributes variety by, instead of exhibiting only ~~one~~ 2 phenotypes, ~~two~~ 3 appear.

Similarly, incomplete dominance mixes, or blends different alleles and allows the ~~many~~ 2

different traits to be combined and produce a new and different traits.

Mutations, if passed on to offspring, can completely change DNA material by changing nucleotide sequence, and can result in phenotype changes which will be carried in the hereditary material from then on.

Polygenic inheritance can produce variety because when more than one gene affects the phenotype, these genes can have multiple combinations and create many different phenotypes

Crossing over causes genes to unlink and varies the order of genes on chromosomes. This causes some traits which are usually linked to be associated with other traits. An example is when blue eyes, which are usually associated with blonde hair, are linked with darker hair.

Chromosome numbers, when changed can change phenotypes greatly. As a result of non-disjunction an organism might have one more or one less chromosome. These chromosomes contain many genes and can change

many different traits. Either all the traits represented on that chromosome are missing or all are duplicated.

As a result of polyploidy an organism is left with one or more whole sets of chromosomes. This gives the organism innumerable gene differences and even creates a new variety in species.

Essay

Codominance is produced within the limits of the existing gene pool because when people have two different color hair the offspring might have some colors of each without being blended.

Incomplete dominance is produced because it is the condition in which two alleles are both expressed in a heterozygote by being blended. For example if

a black person and a white person had an offspring his color might be in between black + white a blended color.

A mutation could produce different phenotypes because this is a change in the hereditary material that may change the phenotype of the offspring example if the hereditary material changes it might cause cystic fibrosis, albinism or sickle cell anemia

Polygenic inheritance would be another; polygenic inheritance is 2 or more genes each with its respective alleles, jointly affecting the expression of a given phenotype. The more genes that operate to produce a trait, that its phenotype would vary. His Polygenic inheritance includes height, intelligence, skin color and many sexual characteristic

Crossing-over: Because chromosomes cross over. They brake off and then rejoin. The upper part of 1 chromosome

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would join with the other member of its homologue. In humans it may be seen in persons with blond hair & dark eyes This chromosomal activity could rearrange certain genes

Chromosomal Aberrations:

might be because if it becomes looped on itself. If the loop brakes the ends reform in a reversed position causing an inversion. This might affect the frequency with the crossing over. This would occur between 2 linked genes This is example of Chromosomal Aberrations others are deletions, duplication and translocation

If meiosis fails to occur normally the gametes produced may have an abnormal number of chromosomes. In this non disjunction occurs. Gametes often do not survive. If one does survive an abnormal offspring is produced

also in this polyploidy might occur meaning the chromosome number by 1 or more whole sets of chromosomes

The quintessential responsibility

The microcosm of a short, eighth-grade general science assignment exposed the difficulty of grading papers when students write to learn. Fred Fairfax gave his class this assignment:

> In a few sentences, explain the difference between an inference and an observation.

If it took Fred a long time to grade all 37 papers, it was not the quantity that slowed him down. He might have taken a little less time to check 37 true-false quiz papers, but not much less. The difficult tasks here were to draw the line between passing and failing, and to distinguish among marginal, average, better than average, and excellent papers. Others thought the papers showed wide disparity, but Fred squeezed them all within the range of A to C-. Here, in order, are two A papers, a B paper, and a C- paper.

A

"Inference and Observation"

The difference be-
tween an inference

and an observation is that an observation is fact. An inference is to infer.

It is like saying ~~for~~ an observation if you see the house is red. That is an observation, but if you infer there is nobody home because there is no car in the driveway. That is an inference.

The Difference between an Inference and an Observation

An Inference is an interpretation of an observation such as, if you were riding your bike by a house and you saw a dog house in the yard you would

infer that there is a dog living in that house, but if you saw the owner calling the dog for supper you would observe that ther is a dog living in that house. You are using your senses ~~ass~~ to observe.

B

The difference between an inference and an observation is that an inference is something that can not be proven a fact by using your senses. On the other hand, an observation is something that you can use one a more of your senses that proves it to be true.

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C-

The difference between an observation and inference is observation is a fact an inference is an opinion or interpitation of observation something

In passing, please note that Fred Fairfax's inference-observation assignment is an excellent example of the kind that may be used in almost any subject at any grade to confirm a bit of learning. It takes only 10 minutes of class time; but for that length of time it relegates students to the solitude of their own minds, where they must sort out, then compose complete statements of understanding. It is a simple and convenient way to help students come to *have* ideas. By comparison, ten minutes spent filling in blanks or responding to true-false or multiple-choice questions are likely to be a waste of educational time.

Correct but wrong; incorrect but right

Students in Barbara Burke's ecology class showed that correctness is not to be mistaken for learning.

Barbara showed the class a film that highlighted an ongoing controversy about the use of national parks. The following day, she gave the class 20–25 minutes to do this assignment:

> The film "National Parks: Playground or Paradise?" presented two sides of current controversy. Summarize the two viewpoints, citing examples supporting each side.

Obviously, neither of the papers below would win a prize in an essay contest. For all its baffled statements, the first is nevertheless essentially correct in its grammar and spelling. By contrast, the second paper—judged by most conventional standards—can only be called hideous.

The question Barbara had to answer, however, and the question she put to the workshop were, "Do these papers accomplish the assignment? If they do, how well do they accomplish it?" Here are the papers.

1. The film "national Parks" : "playgound or Paradice?"
presented two sides of current controversy
Summarize the two view points presented
citing examples supporting each side

One sides ~~of~~ viewpoint ~~to take problem~~
dealing with the problem to make
Playgrounds national parks or let the
regional barrier take care of it is that
Playgrounds are living space too, and if
they are let to be destroyed then who
is to say outdoor woods and national
parks have more right to flourish.
Another side viewpoint is that woods,
parks ect are being taken care of and
effort is being put toward them but
playgrounds and various sort of local sur-
roundings are small and unimportant,
they should be handled by communities them-
selves, but Communities don't want to be
bothered, or if they do care there are
no volunteers to take care of it.

The film National Parks: Playground or Paradise? presented two sides of a current controversy. ~~Explain~~ Summarize the 2 pts of view presented, citing examples supporting each side.

The controversy was whether or not to let just anybody into the parks. (?) There were people who wanted ~~it~~ to let anybody in (Playground) and there were people people who wanted the parks open to just certain (Paradise). The people who thought it was fair letting people in justified their argument by saying that the parks are a national thing. They should be open to the ~~public~~ public. They want the ~~parks~~ parks preserved, but they still want them ~~open~~ open to the public. They wanted to risk destruction for the enjoyment of the people.

The other side (Paradise) realize that these national wonders are not something anybody can come into. They want these parks open to only the few % of people who really care about these places and that want them reserved. They feel that if only the people who care are ~~let~~ let in the parks will survive. But who's to say who cares and who ~~doesn't~~ doesn't care?

Workshoppers agreed with Barbara that the first paper missed the boat, and graded it F. They also agreed with Barbara that the second—its rough and messy prose notwithstanding—not only carried out the assignment, but revealed understanding of the issues involved. They graded it B. That B paper, by the way, is a good reminder that it is unrealistic and unreasonable to expect students (or anyone else, including professional writers) to produce polished prose when they are writing against a clock or under the kind of pressure a crowded

classroom makes. Those crossed-out words on the B paper may very well be the evidence not of a sloppy writer, but a mind at work.

Our inventive math teachers

Perhaps because literacy is so different from "numeracy," writing so alien to teaching and learning mathematics, inventiveness was a peculiar requirement of math teachers in the project. They were prompted not only by Jane Springfield's provocative kind of curiosity but also by curiosity piqued by bafflement like Mike Bethesda's. It was Mike who observed that math students commonly learn procedures without understanding the mathematics involved. He didn't cry "Eureka!" but he acknowledged with evident relief that when he had students explain in writing what it was they did when they worked equations, they began to understand the mathematics.

Singling out discrete pieces of knowledge was comparatively easy for the mathematics workshoppers, who were quick to come up with sharp questions, like these:

> Explain what an angle is and how you label it.
>
> Using complete sentences, define the slope of a line. Discuss the implications of zero, positive, negative, and no slope.
>
> What is the difference in the mathematical terms *factor* and *coefficient*?

Although some of the plans they developed for life after the project included assignments for longer papers, some written out of class, it was their consensus that short papers (10–15 minutes), written in class, served their purposes most dependably.

In *Teaching Mathematics: What is Basic?*, Stephen S. Willoughby voices one of the chief criticisms of textbook mathematics. "Mathematics textbooks, with rare exceptions, are packed with unrealistic problems nobody would ever solve in real life."[8] Mike Bethesda had a knack for making rare exceptions. One assignment he gave in the project was to write a paragraph explaining how to identify the angles that result when an angle has been dissected, for a student who had been absent when the class covered the topic. Another assignment that follows is not only appealing, but exemplary for its explicit instructions. The student's paper was graded A. (A Ring Ding, by the way, is a confection produced and trade-marked by a commercial bakery.)

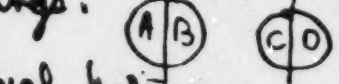
Harry Lewis, the author of your geometry textbook, is revising the edition we are using. He wants *you* to rewrite for him the section on the division postulate. Using the following guidelines, write the section that will appear in the fourth edition of *Geometry—A Contemporary Course*. You will, of course, receive royalties which will most likely make you a millionaire.

Guidelines:

1. Review the current section on pages 118–120.
2. In your revision use a practical example. You may use the Ring Ding story if you cannot come up with a story of your own.
3. Provide two illustrative problems so that one deals with segments and the other with angles. Solutions must be provided.
4. You must close your book when you begin to write.

The division postulate deals with a few things. One of them is that when two segments or angles have the same measure and they are divided into halves the halves would also be equal.

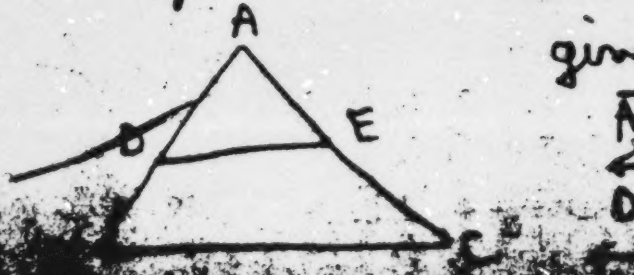
Here is a story about four kids and two ring dings, that will explain most of the division postulate to you. There were four kids that all wanted a ring ding, but there was only two ring dings. Their mother told them that they would all get an equal amount. For me to show you how this was done I will draw a diagram of the 2 ring dings.



As you can see, I cut each ring ding into two equal halves, halve A, B, C and D. The division postulate says that A is equal to C and A is equal to D. It also says that B is equal to C and B is equal to D. Now you can see that the two ring dings are split up equally and the kids can sing in and let them not ~~sing~~ knowing that their mother just used the division postulate to solve the problem. The mother probably didn't even know it was the division postulate herself. On the back I drew just

geometric diagrams showing you what it looks like in geometry.

diagram #1



given:

$\overline{AB} \cong \overline{AC}$

$\overleftrightarrow{DE}$ bisects $\overline{AC}$

$\overline{DA} \cong \overline{EC}$

(AB and AE) of congruent

(AB and EC) are

Congruent

$\overrightarrow{AE}$ bisects $\angle DAB$

$\overrightarrow{BF}$ bisects $\angle EBA$

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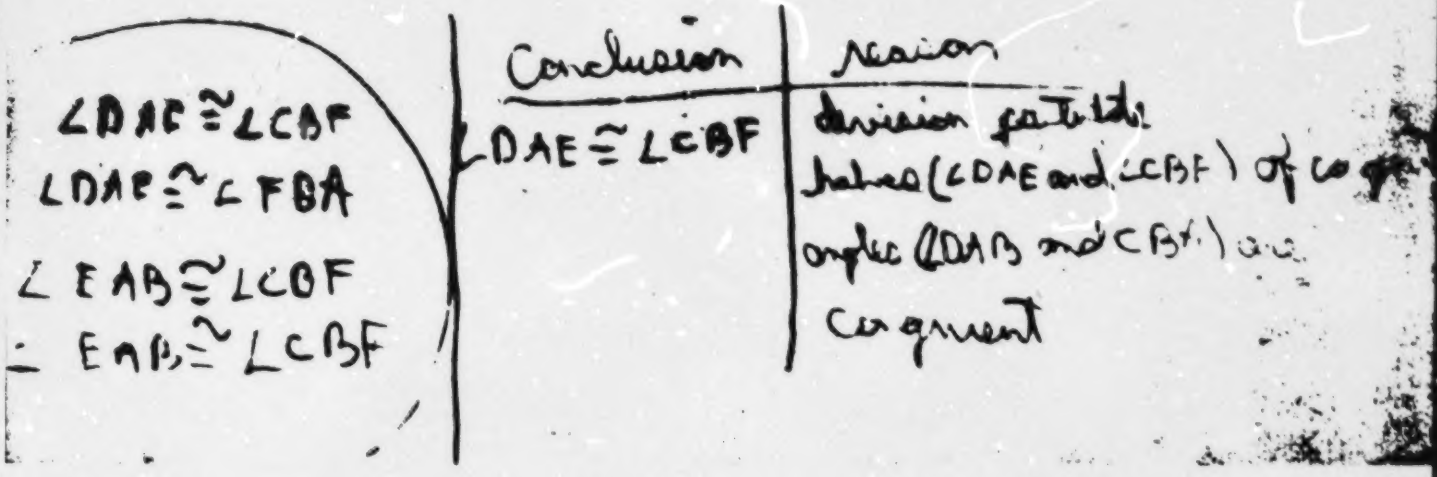

Jane Springfield gave the assignment below to one of her students as homework the evening before they were to have a test in class. She found that writing was an especially effective study discipline when students were preparing for conventional mathematics tests. She graded their writing, nevertheless, and counted the grades. The paper included here was a B paper.

> Discuss all possible positions of the graphs of two linear equations in the plane. Include in your answer the importance of slope and y-intercept on each of the positions. Identify each position as consistent or inconsistent.

There are three possible positions for two variable equations on the graph.

The first of the positions is parallel lines. Parallel lines are lines that have the same slope but different y-intercepts, thus never meeting. Parallel lines, having no point in common, are accepted as having the only answer. Systems such as these are called inconsistent.

The second of the positions is coincident lines (sometimes called simultaneous lines). These lines are lines that have the same slope and the same y-intercept (or are the same line). The solution set for these systems is an infinite set. This kind of line is considered consistent.

The final possible position of lines is noncoincident (or different lines). These lines have different slopes and (sometimes) different y-intercepts. The solution set for such systems is one specific point. These are also considered consistant lines.

Teachers in the project were warned that until writing became a regular part of their routine, they would spend what probably seemed like an inordinate amount of time making assignments and grading papers. Mike Bethesda used the assignment on page 33 early in the project, and he must have taken a lot of time to plan and carry it out. Jane Springfield used the assignment above after writing had become the practice in that class of 29 algebra students. She noted that she read and graded all the papers in one 15-minute sitting.

Reluctant learners and slow learners

In one of his algebra classes, Doug Lincolnia had two students who refused to write. Doug didn't tell them at the beginning of the year that they would have to write—writing wasn't part of their "contract" with him. They could do the problems, so why write? And Mark Annandale said of the students in one of his history classes, "They wouldn't be interested if I stood on my head and spat nickels." They were high school juniors and

seniors who didn't want to be in school, and they were taking a kind of soft-shoe survey course to meet their diploma requirements.

Teaching the great unmotivated has become one of the most challenging and, without a doubt, probably the most discouraging responsibility of schoolteachers. Mark found that writing helped to interest his survey students in the sense of giving them a stake in the work of the course, and with the stake some sense of security in their work. Judged by any conventional standards of literacy, these written responses of one boy to an identification question are about as far beyond the pale as one can imagine a high school junior or senior; but, as Mark commented, "He now makes sense." (The dittoed copy of the original paper could not be duplicated. In the following typescript rendition, the student writer's grammar, syntax, spelling, and lack of punctuation have been faithfully reproduced, however.)

> Triple Allianc Germany Austria Hungary and Italy formed the triple allinec dived Europe into two armed camps was a major cause of World War I
>
> Tripele Antene—Great Briten, Fance and Rusia ferned Tripel Antent—allied powers promised to help one another in war
>
> Neutralty—A police that tryed to keep the United States out of war

Although at least one of Doug Lincolnia's mutinous pupils did break down and write (quite respectably, at that), Doug emerged strong in the conviction that writing to learn can be practicable only when it is official school policy. He may be right, and his conviction is close to the truth that writing will serve the ends of education only if it is a regular part of the fabric of teaching and learning in school.

Be that as it may, the experience of Mark Annandale and Doug Lincolnia encourages me to believe that writing may be one effective way to motivate the unmotivated, to give them a stake in schooling and learning. And the experience of Walt Greenbelt suggests that writing may indeed be a constructive way to bring along some of the boys and girls who are left behind in school.

For one of his presentations Walt used the writing of students in a seventh grade remedial class. These students were not casualties from history or social studies classes; they were simply youngsters who had been tagged "remedial," and Walt had the temerity to imagine that writing might help to remedy their deficiencies.

They had been studying the Soviet Union, and had discussed with interest and at some length the subject of religion in the USSR. Walt set them to write a paragraph on this "topic sentence": "It appears that religion is

again becoming popular in the Soviet Union." He based his evaluation of the following three paragraphs (in order, marked B, C, and F) on their use of specific detail to support their statements.

It appears that religion is again becoming popular in the Soviet Union now and more younger people are starting to go to church. But not for religious reasons, now in the Soviet Union mostly old people go for religious reasons they still have beliefs in god. But the young generations never had the time or privileges to even go to sunday school. Now young ones go to the church just to see the decoration and to hear the music.

It appears that religion is again becoming popular in the Soviet Union. Because the grand-parents are teaching them religion and they hae talking about religion around the Soviet Union again. Then the parentes and children will teach their children religion to and it will going on for generation to generation.

It appears that religion is again becoming popular in the Soviet Union. More and more parents are getting their children to believe in God.

For a certainty, two of these three remedial students had more than grades to show for their progress; they had the palpable evidence of achievement in their writing. It would be ridiculous to contend that writing is the key to motivation in school, or that writing is the remedy of all learning disabilities. However it is not ridiculous to propose that writing be considered, and tried, as a plausible and perhaps promising way to meet these epidemic liabilities in the education of young Americans.

Writing in English to learn French

The invitation to school heads to propose teachers for the project did not mention foreign languages. I was certain enough that students in school could and, indeed, should write in French to learn French, for example; but I had no idea how to assimilate teachers of foreign tongues with teachers whose students would be writing in English to learn science, history, or whatever. Reluctant to turn away any teachers who were interested enough to apply, however, I said in effect, "Come along, let's find out," and welcomed two teachers of French, one in each of the project groups.

It was they who did the finding out, they who removed my dilemma. They found that writing in English helped their students learn French. Two months after her group's final workshop, Ellen Chantilly spoke for both when she reported, "Overall, using the writing of English in French is improving comprehension for my students. They pay better attention and make more of an effort when they know they have to write."

Ellen's plans for classes at four levels of language study called not only for short papers strictly on questions of language or literature, but also for longer papers on historical or cultural topics. One of her presentations represented the culmination of an entire unit's work for her French III and IV students. Nineteenth century French painting was the topic, and the study had included research assignments and a museum visit as well as reading assignments and class discussions. In advance of their museum visit, students were given three questions; in class two days after the visit, they were given the option of writing on the question they thought they could answer best.

The prospectus Ellen Chantilly developed for her classes points the effective way to good liberal education and to what is now called "global education." When it came to the nitty-gritty of learning the French language, however, both project teachers found that the attentiveness of their students to spoken French was closer—and, as a result, their comprehension substantially better—when they had to summarize in writing what they heard. Ellen had them write summaries of taped stories; and with some of the same flair that has won acclaim for John Rassias of Dartmouth College, Bradley Rockville leaves his class, from time to time, to return moments later as M. Yves Dupont. Then he lectures on a topic of importance to the class's current study. M. Dupont may slip once or twice into English for a word or a phrase when the momentary response of the class indicates that he has used an unfamiliar expression, but otherwise his entire lecture is in French delivered at a good clip. When he finishes and becomes Mr. Rockville once again, students write. Brad gave one presentation of papers students had written on a lecture he had given to introduce *Les Miserables*. One was, hands down, an F paper; but the workshop agreed heartily with the comment Brad wrote on the A paper, "Tu as une comprehension extra-ordinaire! et tu t'exprimes bien." (On the C+ paper, he wrote, "Tu as compris l'essentiel. Avec le temps tu feras du progres.")

The paper that follows is not the summary of a *lecture,* but the summary of a report one of Brad's students gave on lasers. The report, of course, was given in French.

A Bien compris et bien écrit!

The idea of the laser dates back a long time, but the actual invention has been around only some thirty years. In 1870, Jules Vernes, in his book 20.0[illegible] leagues under the Sea, describes how Capt. Nemo protected an island with the use of lightning. In 1898, H. G. Wells described in his novel, The War of the Worlds, how Martians used laser cannons in attacking the earth. It was in 191[illegible] when the young Albert Einstein had the first idea of actually inventing the laser, but was not possible for that time, and he had to give up the idea. In 1951, an Amer

ican Charles Townes decided to follow up on Einstein's idea and in 1953 actuall invented the first laser. It was not longer science fiction - it was real.

The laser is not a regular beam of light; it is a highly concentrated direct ray of powerful light rays. It is so precise that it is used to make perfect vertical lines, practical in the plans for high buildings. It is also applied in modern medicine as a very precise tool in operations, notably on the eyes. It is so powerful and fast that it can pass through 100 pants, shirts, and dresses at the same time. It is a revolutionary device which has created new possibilities for medicine and technology

The writing wrestler

In high school, the writer of the following paper was an A wrestler and an F student. "Go to prep school for a year," said the college of his choice, "and show us that you can be an A student, and we'll accept you."

His was the best of three papers Steve Woodbridge presented from a senior elective course in economics. Editors would be quick to say the paper "needs work," and top bankers would undoubtedly argue that it wraps up the wrong answer. Steve and the workshop nevertheless agreed that students who write papers like this one make it "cool" to learn.

The question was,

How would a rapid and drastic decline in oil prices affect our economy?

Students were given 30-35 minutes of class time to write. Here is the wrestler's paper.

A rapid and drastic drop in O.P.E.C prices would not be as terrible as some analysts may suggest. The oil ministers of O.P.E.C. suggest that O.P.E. and high prices are good for our econo Top executives of the major banks and

oil companies agree. They contend that O.P.E.C. is such a vital part of our nations' banking system that a decrease in oil prices will cause a decrease in revenue to these O.P.E. countries. With a decrease in revenue these countries, which are great depositors into our banks, would curtail deposits or worse, say Top bankers, pull out some of their money. Such a pull out could collapse or weaken Western banks. The banks would have to collect debt. With so many loans given out to poor countries, who can not pay back the loans, the banks would be put into a position of default. The problem with this so called "rollover" scenario is the lack of these bankers to foresee the great benefits lower oil prices would bring. Decreasing oil prices would cause all petro-chemical industries to cut prices. Coal and oil based energies would become cheaper. The Western and American consumer would experience actual deflation of prices. He would have extra money to invest or save. With this increased demand for cheaper oil products, and with greater investment and savings, the American economy would pick up. With a greater money supply available, interest rates would drop thus making loans more easily available for the poorer nations to borrow and pay back the loans.

Opponets to lower oil prices say that with lower prices comes increased demand for oil products and thus the prices will

again. They argue that this increase in oil prices would be far more severe than the past two increases in 1973-74 and 1978-79. True, some increase in demand would occur but many analysts tend to believe that a huge increase in demand will not occur. These people argue that we are better prepared this time. Many of the our conservation measures are in place and would not be lost with a lowering in prices. Downsized cars will not vanish, either will Boeing's new 767 and 757 jets, nor will people tear out installed insulation. There are only examples, but perhaps the best may be Westerners memory of hardships high oil prices have brought and could bring.

Making the presentation, Steve Woodbridge said that once his students gave up worrying about how much their papers count, they came to like writing. About an assignment like this one, he tells them, "This is important. It will count something like a test, and I'll give you the benefit of the doubt. Trust me." Evidently they do trust him; grades have not been an issue since the first paper. Steve no longer writes comments on their papers. He reads and grades a set in one evening.

Writing in history and the social studies

After "objective testing," following a kind of Gresham's Law of Literacy, drove essay exams out of the schools; and even when literacy in general appeared to be tumbling toward crisis, writing never fell altogether out of favor or fashion in history and the social studies. In those subjects, students traditionally wrote the answers to test and examination questions, and old reliables like "Describe the weaknesses of the Articles of Confederation" and "Trace the steps by which the United States entered the First World War" persisted here and there through writing's darkest hours.

For not a few history and social studies teachers, writing to test was old hat. Writing to learn, however, offered them something new, different, and (I should like to think) better. Project history teacher Jean Herndon put it this way: "My students always wrote quite a bit, but now I'm more aware of the idea of *writing to learn*, and this has been an important factor as I make up questions."

Let it be acknowledged promptly that the old reliable questions still have an important place in teaching and learning history. To be able to consult history, one has to have one's facts straight and exercises like tracing steps and describing weaknesses help get facts in intelligible order, especially when one puts them down in complete, coherent statements, using one's own words. That is what is meant by "learning history." But to learn *from* history, to understand and value history, students need writing that calls for analysis, imagination, and synthesis. Terry Washington raised some workshop eyebrows, but he must have excited the historical imagination of 10th-graders in a Western Civilization class when he set them to make a case for the assassination of Caesar. And although the question poses conditions contrary to fact, this one Bob Chase gave a United States history class must have helped 11th-grade students learn how to use the facts of history to gain perspective:

> Some observers have maintained that Lincoln, had he lived, would have been able to restore the Union under his Ten Percent Plan; and thus the period now known as Radical Reconstruction would never have occurred. Write your own opinion, using relevant facts to support your argument.

The class had spent a week or more studying Reconstruction, but had no inkling that such a question would be put to them. They had 20–25 minutes of class time to write.

- It was natural that after a Civil war, in which the Federal Government was violently rejected by some of its subjects, there should be a balancing trend toward conservativism. This is illustrated to a lesser degree today, with the rise of the New Right. Radical Reconstruction was the balancing trend; the loss of Lincoln removed one important modifier on Reconstructive affairs.

Lincolns 10% plan would have been ineffective in completely restoring the Union. and his death

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guaranteed that Reconstruction would swell, become more popular. However, the American society was incapable of submitting to the necessary powerful central government, and therefore reconstruction was doomed from the first.

Regardless of Lincolns plan, Radical Reconstruction was the natural, inevitable result of the Civil War; a backlash to the Souths insurrection. That it was destined for failure was due to the structure of American society. which has not changed significantly in the last century.

Bob yielded to the judgment of the workshop and raised the grade he gave this paper from C to B-. His concession may have been just that and nothing more—a change of grade, not of heart or mind, for agreement's sake there and then. But the concession calls for comment.

The practice of modifying grades with minus or plus signs is a dubious practice. I suspect it reflects insecurity more often than it reflects fine discrimination. Granted, good assignments often escape the kind of precise criteria that afford teachers foolproof security. Bob's question did, by posing a condition contrary to fact and inviting students' opinions. So did other assignments presented in the project. But does it serve any constructive purpose to suggest with a grade of B- that a student's work is "better-than-average-but-not-quite"? And is some excellence more excellent than excellence itself, which a grade of A+ implies? Or is it part of every teacher's quintessential responsibility to reach the defensible decision that this student's work is average, for example, and that student's work is better than average but not excellent?

Writing to teach

The subhead may be misleading. Joseph Church did not forsake the pedagogy specific to his subject for writing to teach. Having students write to learn, however, gave him the idea that occasional writing by him, for them, might enhance the teacher-student connection. Once he had that idea, Joe used it to publish BIO-BULL

(for Biology Bulletin), a weekly piece in which he makes comments about the class' recent work, anticipates work about to be done ("H.W." stands for *homework*), and passes along incidental intelligence of likely interest to students of biology.

Although the teacher-student connection hardly needed enhancing, BIO-BULL has made a difference, and that is easy to understand. At the same time, Joe holds that putting each issue together gives him a sharp focus for the week's teaching. That schedule of class activities and homework assignments represents commitments, he explains.

December 13-17

BIOLogy BULLetin

Let me say that I am very pleased with the way that you worked independently during the time you studied the Protozoa. All you need to do is to perform well on the test to make it a complete success.

During this week, we will begin to study how materials get into and out of cells. We will not complete this unit until after the vacation.

I HOPE THAT YOU HAVE A TRULY HAPPY HOLIDAY SEASON AND A WONDERFUL NEW YEAR!

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MONDAY: Complete Protozoa unit
All work will be collected at the end of the period.

TUESDAY: Discuss Homeostasis/Simple Diffusion
H.W. Prepare for test (Ch. 18, handouts 59-63)

WEDNESDAY: Test - Protozoa
H.W. - read ch. 5 "Cell and Its Environment" pps. 61-69

THURSDAY: Lab "Membrane Transport" - handouts 66 + 67
H.W. - complete handouts 68-69

FRIDAY: Complete lab "Membrane Transport" - report due on Tuesday after vacation 1/4/83.
Filmstrip - "Diffusion and Osmosis".

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4.
REFLECTION AND RESOLUTION

Almost without exception, the response of teachers following the workshops was enthusiastic, appreciative. One—a middle school teacher who called it "pathetic" that high school teachers found the idea of using writing in their classes innovative—said the workshops were repetitive. Others were positive, even determined. One offered that the workshops "did *inspire* us non-English teachers to attempt more." Another was "convinced of the need for my students to do more writing . . . to prove to themselves that they understand what they are studying." Explicit as well as articulate was the comment of the teacher who found the project "encouraging, motivating, and reassuring." She continued,

> I now feel confident about using writing as a teaching tool as an indicator of student understanding. I no longer feel intimidated by the thought of "extra work" when I use writing. [The workshops showed us] not only the advantages to teachers and students of using writing, but also how to *handle* the writing so as not to cause undue burden.

The dilemma of coverage

If there was a significant reservation or misgiving among them, Mike Bethesda gave it voice when he observed that the benefit of writing must outweigh the coverage of a syllabus in order to be practicable. Earlier he had referred to a department meeting at which a major concern was "the overwhelming burden of the material that 'should' be covered in a plane geometry course . . . We are concerned with allowing time to teach topics presently and embarrassingly not covered." Mike was frank to say that "it is going to require a great measure

of self-discipline and a deep commitment to the 'write-to-learn' philosophy to make writing an integral part of my geometry course."

It doesn't make much difference whether the subject is mathematics, science, history, or whatever—teaching can be, and commonly is, a race to finish the course. The teacher who is good enough—that is, clever enough, or simply fast enough—wins the race, taking across the finish line as many students as are able to hang on. The metaphor of a race is not inappropriate; but like the reality it represents, it is offensive to education.

The coverage syndrome begins with recognition of the obvious. If students are to have the benefit of any subject, their teacher must cover at least the fundamental topics. Designated by curriculum experts in the school system, or by Educational Testing Service and College Board types even farther removed from the classroom, these become an effectual external constraint on teachers. To it, add the internal constraint of teachers who know their subjects and find it difficult in the extreme to let any topic go, and the coverage syndrome just about precludes education. One wonders what resulted in Mike Bethesda's department when "each geometry teacher was charged with the task of preparing a list of those topics we feel could be deleted from the course."

The constraints are real and not to be gainsaid. Teachers will not make the burden of coverage any less overwhelming by withholding their commitment to writing, however. To the contrary, commitment should lighten the burden by putting in clearer perspective the topics that need to be covered, the work that must be done. When, having identified the topics, a teacher makes and carries out plans that include assignments calculated to help students learn them, the teacher will almost certainly spend more time on material students need to know, and less on material they really do not need to know, valuable and interesting as it may be.

Writing to learn is not a pat answer to the dilemma of coverage, and commitment is not going to eliminate any teacher's race to finish the course. It will help to clear the way, however, and more students will cross the finish line under their own power. Ellen Chantilly saw the light when she wrote, "I must admit that this does make more work for me. However, I feel that my teaching is improved, and that makes it worthwhile."

Assessment

Teachers who are following plans they developed for the project confirm their early estimates.* More than half

*Not all the teachers in the first group complied with my request to submit plans after the last workshop. Teachers in the second group drafted outlines at their last workshop, and followed up with revisions, refinements, or reports six weeks later.

the members of one group came together again after six months for a "reunion" workshop, and I have been able to keep in touch with as many in the other group. The assignments they have given, the papers their students have written, and their comments and suggestions are evidence that most of the project teachers are off and running with the idea of writing to learn.

How far will they run? Only time will tell.

"Do you feel that your students' work has improved because they are writing?" I asked those who came to the reunion, and begged them not to mislead me. Their answer was definitely affirmative. They assured me that *at the least*, writing had required a commitment on the part of their students, involved them in some measure intellectually, and given them an interest or stake in schoolwork. Individual reports from members of the other group have been no less encouraging, with the clear implication that students who write learn soundly and come to like learning.

The writing wrestler was ultimately accepted by the college of his choice, but we will never know what writing had to do with his acceptance. It would take thousands of students in and out of "control" groups, as well as several years, to make an assessment by any conventional measure; and although it might suggest some correlation of writing and learning, such a measure would never provide "hard data" to prove that the wrestler learned more economics, or learned more soundly, because he wrote in Steve Woodbridge's class.

Yet must writing to learn have empirical proof to be warranted a role of the entire curriculum of schooling? At a time when the general level of teacher competence is seriously in question and writing gives them the means to teach more effectively; when the general level of student achievement is dangerously low and writing helps to raise that level; when countless kids are bored out of their minds in school, and writing gives them a stake in schoolwork; when budgets are tighter than ever and writing to learn costs little—at such a time must writing wait for the proof it will always escape?

I should hope not.

What next?

Teachers in the project had concrete suggestions for more workshops.

To spread the gospel, let future workshoppers be responsible for making presentations to other teachers in their own schools. One-day workshops might attract more teachers than a series of three or four. Stress the im-

portance of building students' confidence in writing. In a series, one workshop might be devoted to building the confidence and developing the skill of teachers themselves as writers.

That one of the groups had a near-majority of history and social studies teachers was largely the result of a misunderstanding discovered too late to rectify. The disparity prompted one of two science teachers to recommend a better balance "so that two science teachers are not constantly listening to eight social studies teachers." Both suggested that workshops limited to teachers of the same subject or kindred subjects might promote more effective exchange of ideas.

Familiar was the expression of need for the support of school administrators. Responsive to the expression at the reunion workshop was one assistant superintendent. Specifically what can administrators do, he asked, to support writing to learn? Make it school policy, recommended Doug Lincolnia. Others seconded the recommendation. Important, too, they agreed, is reliable demonstration of the personal interest and confidence of principals and superintendents in writing as a discipline of learning—more important than money they might appropriate or materials they might buy. Well taken, these suggestions will be helpful in planning more workshops.

And there will be more workshops. Beginning with the National Commission on Excellence in Education, all the would-be school reformers who have reported to date have given literacy primary attention in their recommendations. The Twentieth Century Fund's task force put the matter succinctly: "The most important objective of elementary and secondary education in the United States is the development of literacy in the English language."[9]

In *Less Than Words Can Say,* Richard Mitchell makes the point that in order to operate our elaborate and technological civilization, we must have millions of people who can "construct and follow discursive thought"—literate people, that is. He's dead right about that. If, as he also contends, the literate person is in control of the techniques special to writing, there *must* be more workshops. With no prospect brighter than that of the moment, the condition of literacy may improve perceptibly, but it will not improve significantly. Unless writing becomes part of the whole fabric of learning in America's schools, we will be lucky to have thousands of people able to construct and follow discursive thought.

NOTES

1. Richard Mitchell, *Less Than Words Can Say* (Boston, Toronto: Little, Brown, and Co., 1979), pp. 170–171.
2. "The Great American Writing Crisis" is the title of an article by Phyllis Zagano in the Winter 1976–1977 issue of *Search*, the magazine of the State University of New York.
3. J. Mitchell Morse, "Green Leaves and Plausible Settings," Temple University Alumni Review, Fall 1975; A. Bartlett Giamatti, "The Writing Gap: Sentimentality," Yale Alumni Magazine, January 1976.
4. The quotation is in *Newsweek*'s cover story, "Why Johnny Can't Write," December 8, 1975.
5. Shirley Boes Neill, *Teaching Writing: Problems and Solutions*, a Critical Issues Report of the American Association of School Administrators, 1982, p. 20.
6. Arthur N. Applebee, *Writing in the Secondary School: English and the Content Areas*, Research Report No. 21, National Council of Teachers of English, 1981, p. 100.
7. Mitchell, p. 215.
8. Stephen S. Willoughby, *Teaching Mathematics: What Is Basic?*, Occasional Paper 31, Council for Basic Education, 1981, p. 19.
9. *Making The Grade: Report of the Twentieth Century Fund Task Force on Federal Elementary and Secondary Education Policy*, p. 11.

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